

Spacecraft Thermal Control System Not Requiring Power, Phase II

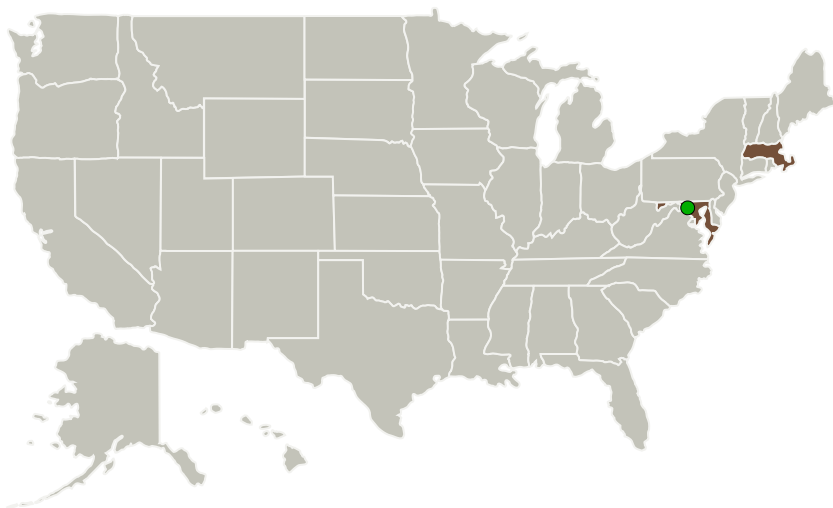
Completed Technology Project (2015 - 2017)




Project Introduction

NASA missions, from earth orbit CubeSats to deep space, require thermal management. For this a switchable emissivity surface is desired, but the only established solution, mechanical louvers, is heavy and clumsy. In Phase I, Triton Systems working with materials scientists at a leading research university demonstrated an innovative film which switches from low to high emissivity above a set threshold temperature. Feasibility experiments showed the film self-switched from a low emissivity 0.08 to a high peak emissivity 0.97 above a critical temperature which can be engineered in the range 10-70C as required for a specific application. The film has no moving parts, is composed of all solid state, stable materials, can be deposited on flexible polyimide substrates, requires no external power or control, and shows no sign of deterioration or fatigue over millions of temperature change cycles. Environmental tests will be carried out.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Triton Systems Inc.	Lead Organization	Industry	Chelmsford, Massachusetts
 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland



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Primary U.S. Work Locations

Maryland

Massachusetts

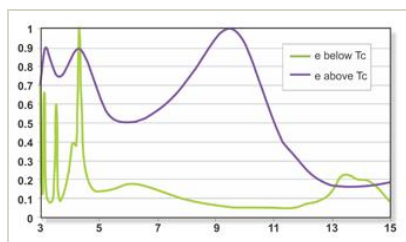
Project Transitions

**May 2015:** Project Start**August 2017:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137472>)

Images



Briefing Chart

Spacecraft Thermal Control System
Not Requiring Power Briefing Chart
(<https://techport.nasa.gov/image/135423>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Organization:

Triton Systems Inc.

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

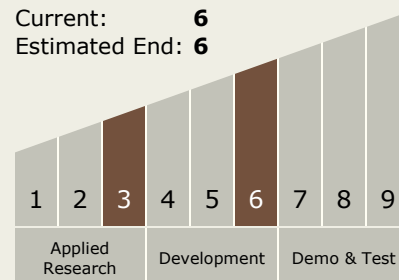
Carlos Torrez

Principal Investigator:

Larry Domash

Technology Maturity (TRL)

Start: 3
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.2 Thermal Control Components and Systems
 - └ TX14.2.3 Heat Rejection and Storage

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System